



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE

United States Patent and Trademark Office

Address: COMMISSIONER FOR PATENTS

P.O. Box 1450

Alexandria, Virginia 22313-1450

www.uspto.gov

| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|--|-------------|----------------------|---------------------|------------------|
| 10/565,004 | 01/19/2006 | Tsuyoshi Uehara | Q92479 | 5166 |
| 23373 7590 03/05/2008 SUGHRUE MION, PLLC 2100 PENNSYLVANIA AVENUE, N.W. SUITE 800 WASHINGTON, DC 20037 | | | | |
| EXAMINER | | | | |
| CHEN, KEATH T | | | | |
| ART UNIT | | PAPER NUMBER | | |
| 1792 | | | | |
| MAIL DATE | | DELIVERY MODE | | |
| 03/05/2008 | | PAPER | | |

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/565,004

Applicant(s)

UEHARA ET AL.

Examiner

KEATH T. CHEN

Art Unit

1792

Period for Reply -- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 20 February 2008.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-36 is/are pending in the application.
- 4a) Of the above claim(s) 13-26 and 28-36 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-12 and 27 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/SI/08)
- 4) ☐ Interview Summary (PTO-413)
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____
- Paper No(s)/Mail Date _____

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(c), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(c) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submissions filed on 02/20/2008 and on 02/14/2008 has been entered.

Election/Restrictions

1. Claims 13-26 and 28-36 withdrawn from further consideration pursuant to 37 CFR 1.142(b) as being drawn to a nonelected invention II and IB, there being no allowable generic or linking claim. Election was made **without** traverse in the reply filed on 10/25/2007.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

2. Claims 1-12 and 27 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claims 1, 4, 11, and 27 recite “to cross a side opposite to said introduction port side with respect to said jet port” is not clear, particularly “a side” of what?

Claims 1, 4, 11, and 27 will be examined as “to cross said jet port”.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
 2. Ascertaining the differences between the prior art and the claims at issue.
 3. Resolving the level of ordinary skill in the pertinent art.
 4. Considering objective evidence present in the application indicating obviousness or nonobviousness.
3. Claims 1-6, 11-12, and 27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Perrin et al. (US 6281469, hereafter '469), in view of Okui (English translation of JP 2000109979, hereafter '979).

'469 teaches some limitations of:

Claim 1: A plasma processing apparatus (col. 2, lines 29-34) for plasmatizing a processing gas in a discharge space under a pressure in the vicinity of atmospheric pressure (the apparatus is capable of, by turning off vacuum pump, "under a pressure in the vicinity of atmospheric pressure" is considered as intended use) and jetting the plasmatized gas (col. 10, lines 64-66) so as to be contacted to a workpiece (col. 1, lines 29-31) to be processed, apparatus comprising: a first electrode row including a plurality of electrode members (Fig. 15, row #12A); a second electrode row (Fig. 15, row #12B) including another plurality of electrode members and

Art Unit: 1792

arranged in a line parallel with said first electrode row; one of said electrode members of said first electrode row and one of said electrode members of said second electrode rows, which are arranged in substantially same positions in the extending direction, having opposite polarities and forming a row-to-row partial gap therebetween, said row-to-row partial gap serving as a part of said discharge space(col. 9, lines 1-4), one of said polarities being an electric field applying pole, the other of said polarities being a grounding pole (col. 6, lines 50-55, one of the electrode can be connected to ground); a row-to-row gap including said row-to-row partial gap formed between said first and second electrode rows, an introduction port (Fig. 20, #28) of the processing gas communicated with a side in a flowing direction (vertical direction in Fig. 20) orthogonal to the extending and short directions of said row-to-row gap (horizontal and perpendicular direction in Fig. 20), a jet port (Fig. 20, #23) communicated with a side opposite to the introduction port of said row-to-row gap (jet port is opposite to the introduction port).

Claim 2: those of said electrode members constituting said electric field applying pole being connected to different power sources, respectively (col. 6, lines 56-58).

Claim 3: only those of said electrode members constituting said electric field applying pole being connected to a common power source (col. 6, lines 56-58).

Claim 4 (besides claim 1): two of said electrode members of each of said electrode rows arranged adjacent to each other in said extending direction being opposite in polarity with respect to each other (as shown in Fig. 15).

Claim 5: an in-row gap is formed (Fig. 15, the vertical gaps) between two of said electrode members arranged adjacent to each other in said extending direction in said first

electrode row and/or said second electrode row, said in-row gap also forming a part of said discharge space.

Claim 6: one of said two electrode members includes a first surface (Fig. 15, top line of the first electrode of row #12B, facing #12A) forming said row-to-row gap and a second surface (the face that facing right) disposed at an angle (right angle) with respect to said first surface, and the other of said two electrode members (the second electrode of row #12B, grid patterned) includes a third surface (the face facing #12A) generally flush with said first surface and forming said row-to-row gap and a fourth surface (the face facing left) placed opposite to said second surface and arranged at an angle (straight angle) with respect to said third surface, said in-row gap being formed between said second surface and said fourth surface.

Claim 11 (besides claim 1): two of said electrode members of each of said electrode rows arranged adjacent to each other in said extending direction being same in polarity with respect to each other (col. 6, lines 8-11, periodicity can be omitted if desired).

Claim 12: said polarities include an electric field applying pole and a grounding pole (col. 6, lines 50-55, one of the electrode can be connected to ground), and an insulating partition wall (#24, spacer, Fig. 20, an enlarged view of Fig. 9) is interposed between two of said electrode members having said electric field applying pole which are adjacent to each other in said extending arranging direction.

Claim 27: A plasma processing apparatus for introducing a processing gas into a discharge space under a pressure in the vicinity of atmospheric pressure (the apparatus is capable of, by turning off vacuum pump) from an introduction port (Fig. 20, #28), plasmatizing the gas in said discharge space and jetting the plasmatized gas through a jet port (#23) so as to be

contacted to a workpiece to be processed, said apparatus comprising: a first electrode row including a plurality of electrode members intersecting with a flowing direction toward said jet port from said introduction port (vertical direction in Fig. 20), a second electrode row including another plurality of electrode members arranged in a line parallel with said first electrode row; one of said electrode members of said first electrode row; one of said electrode members of said second electrode rows, which are arranged at a first position in said extending direction, having opposite polarities (grounding pole is an opposite polarity, as defined at the later part of this claim) and forming a first row-to-row partial gap therebetween, said first row-to-row partial gap serving as a part of said discharge space, and another of said electrode members of said first electrode row and another of said electrode members of said second electrode rows, which are arranged at a second position adjacent to said first position, having opposite polarities with each other and forming a second row-to-row partial gap herebetween, said second row-to-row partial gap serving as another part of said discharge space, said electrode member which is arranged at the first position in said first electrode row and said electrode member which is arranged at the second position in said first electrode row having opposite polarities each other and forming an in-row gap therebetween, one of said polarities being an electric field applying pole, the other of said polarities being a grounding pole (above 20 lines substantially the same as discussed in claims 1 and 4 rejection above); an introduction part (#27 and #28, together) having said introduction port (#28) that includes a row-to-row introduction port (one of the opening facing a gap) disposed astride said first row-to-row partial gap and said second row-to-row partial gap (viewing from Fig. 15, a horizontal line) and an in-row introduction port directly connected to

Art Unit: 1792

said in-row gap (#27 distribute gas to both row-to-row gas and in-row gap, see Fig. 15 as top view of Fig. 20).

'469 does not explicitly teach the limitations of:

Claims 1, 4, and 11: (the first electrode rows ... members) each being elongate in an extending direction and short in a short direction orthogonal to the extending direction arranged in a line in the extending direction; (the second electrode rows ... members) each being elongate in the extending direction and short in a short direction; and a conveyor that relatively passes said workpiece through outside of said discharge space under said pressure in the vicinity of atmospheric pressure in a direction intersecting with the extending and flowing directions so as to cross a side opposite to said introduction port side with respect to said jet port.

Claim 27: (the first electrode rows ... members) each being elongate in an extending direction and short in a short direction orthogonal to the extending direction arranged in a line in the extending direction, the extending and short directions being intersecting with a flowing direction toward said jet port from said introduction port; (the second electrode rows ... members) each being elongate in the extending direction and short in a short direction; and a conveyor that relatively passes said workpiece through outside of said discharge space under said pressure in the vicinity of atmospheric pressure in a direction intersecting with the extending and flowing directions so as to cross a side opposite to said introduction port side with respect to said jet port.

'469 further teaches the electrode members being elongate in an extending direction arranged in a line in the extending direction (Fig. 7).

'979 is an analogous art in the field of plasma surface treatment (field of the invention), particularly in providing large area processing ([0004], line 2) for the purpose to achieve uniformity ([0004], line 4). '979 teaches an electrode array (#1, Fig. 3) depositing on substrate (#3-1) over a conveyor (R) while gas is discharged in the vertical direction (Fig. 2a).

'469 discloses the claimed invention except for the shape of electrode member being square instead of rectangular. It would have been an obvious matter of design choice to alter the shape of electrode members, since such a modification would have involved a mere change in the shape of a component. A change of shape is generally recognized as being within the ordinary level of skill in the art. In re Dailey, 357 F.2nd 669, 149 USPQ 1966.

At the time the invention was made, it would have been obvious to a person of ordinary skill in the art to have combined '979 with '469. Specifically, to have replaced the stationary substrate (for example, Fig. 21) with a conveyor as taught in Fig. 3 of '979 and to have changed the shape of the electrode to rectangular, using Fig. 7 as a guide to arrange electrode in an extending direction, for the purpose of achieving continuous coating and uniformity ('979, [0004] line 4), with a reasonable expectation of success.

The examiner takes official notices that it is a common knowledge to arrange electrode (or other objects) in the length-wise direction for the purpose to extend the electrode (or objects).

4. Claims 7-10 are rejected under 35 U.S.C. 103(a) as being unpatentable over '469 and '979, further in view of Koga et al. (US 6518990, hereafter '990).

'469 and '979, together, teach all limitations of claim 6, as discussed above. '469 also teaches various configurations of two-dimensional electrode arrays, including triangular arrays

Art Unit: 1792

where the in-row gap is at non right-angle to row-to-row surface (Fig. 15-17, col. 9, lines 7-9) are suitable.

'469 does not teach the limitation of:

Claim 7: said first surface and second surface form an obtuse angle and said third surface and fourth surface form an acute angle, said in-row gap being in a slantwise relation with said row-to-row gap.

Claim 9: said electrode row on the opposite side of said electrode row having said first surface, said electrode member located in the substantially same position as said electrode member having said first surface is arranged astride said first surface and the end face of said third surface.

'990 is an analogous art in the field of apparatus which utilizes plurality of electrodes to form charge on the substrate (abstract, Fig. 5), particularly in providing various electrode array arrangement (summary of the invention, col. 3, lines 8-44) for the purpose to achieve uniformity (col. 4, lines 19-26, '469, col. 13, lines 2-4). '990 provides a trapezoid electrode array (Fig. 16) having stable application of charge. Such trapezoid electrode array met the limitation of claim 7 and 9.

At the time the invention was made, it would have been obvious to a person of ordinary skill in the art to have combined '990 with '469. Specifically, to have incorporate the electrode array arranged as taught in Fig. 16 of '990 into the electrode array of Fig. 15-17 of '469, for the purpose of achieving uniformity and stable application, with a reasonable expectation of success.

Further, '469 discloses the claimed invention except for the shape of the electrode. It would have been an obvious matter of design choice to have altered the shape of electrode from the various shapes already disclosed in '469, since such a modification would have involved a mere change in the shape of a component. A change of shape is generally recognized as being within the ordinary level of skill in the art. In re Dailey, 357 F.2d 669, 149 USPQ 1966.

For claim 8, '469 further teaches the rounding of electrode surface (for example, Fig. 12). '990 further teaches the limitation of claim 8:

Corners on the side of the obtuse angle formed between said first surface and second surface are R-chamfered with a relatively large radius of curvature, while corners on the side of the acute angle formed between said third surface and fourth surface are R-chamfered with a relatively small radius of curvature (col. 4, lines 48-56).

The rounding of corners has two possible results: one corner having a larger radius or a smaller radius than the other corner. '469 discloses the claimed invention except for rounding of corner. It would have been an obvious matter of design choice to vary the shape of corners, since such a modification would have involved a mere change in the shape of a component. A change of shape is generally recognized as being within the ordinary level of skill in the art. In re Dailey, 357 F.2d 669, 149 USPQ 1966.

'469 also teaches the limitation of claim 10:

The downstream end of said in-row gap is open in such a manner as to be able to jet a processing gas therefrom and without passing the processing gas through said row-to-row gap (Figs. 18-20 show the jetting portion is more open than the gas introduction port, therefore, processing gas formed in the in-row gap can flow downward directly).

Response to Arguments

Applicant's arguments filed on 02/14/2008 have been fully considered but they are not persuasive:

5. Applicant's amendment to remove dependency of the object worked on is acknowledged. However, new claim limitation invokes other issue with 35 USC 112, 2nd paragraph as discussed above.

6. In regarding to 35 USC 103(a) rejection of claims 1-6, 11-12, and 27 based on Perrin ('469), see pages 17-20, applicant's arguments are:

- a. In '469 apparatus, substrate is deposited inside of the discharge space, not outside of the discharge space, see lines 2-4 of page 18, because Perrin does not attempt to generate a discharge between neighboring sub-electrodes 12, see lines 1-2 of page 20.
- b. One of ordinary skill in the art would not be motivated to operate Perrin's apparatus under near atmospheric pressure because the discharge cannot be even generated, without supporting evidence, see page 18.
- c. The combination of "elongate" and "arranged in a line" in the extending direction is not obvious, see the first full paragraph of page 19.
- d. Perrin fails to disclose that the grounded electrode arrangement may be subdivided into sub-electrodes and "the other of said polarities being a grounding pole", see the bottom of page 19 to the top of page 20.

In response to applicant's argument,

a. The applicant characterized Perrin's (not attempt to discharge in sub-electrode 12) without properly citing support. The sub-electrodes pairs (group A, B, C in Fig. 7, for example) is capable of discharge (see col. 5, lines 44-51) and therefore, it is a discharge space. Besides, applicant's apparatus (See Fig. 1) also produces secondary discharge between the electrodes 30X and the substrate/rollers which are at a ground or a floating potential.

b. The apparatus is capable of operating at near atmospheric pressure, as discussed in the rejection above.

Applicant's claim requirement "under a pressure in the vicinity of atmospheric pressure" is considered intended use in the pending apparatus claims. Further, it has been held that claim language that simply specifies an intended use or field of use for the invention generally will not limit the scope of a claim (Walter, 618 F.2d at 769, 205 USPQ at 409; MPEP 2106). Additionally, in apparatus claims, intended use must result in a structural difference between the claimed invention and the prior art in order to patentably distinguish the claimed invention from the prior art. If the prior art structure is capable of performing the intended use, then it meets the claim (In re Casey, 152 USPQ 235 (CCPA 1967); In re Otto, 136 USPQ 458, 459 (CCPA 1963); MPEP2111.02).

c. Applicant statement, see lines 9-14 of page 19, is unsupported by evidence. Perrin does teach "elongate" and "arranged in a line" in the extending direction, as shown in Fig. 7.

d. Applicant admission that electrode arrangements 10 (with sub-divisions of electrodes 12s) may be connected to reference potential (lines 3-4 of last paragraph on

page 19) contradicts to applicant's arguments (that Perrin fails to disclose that the grounded electrode arrangement may be subdivided into sub-electrodes).

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to KEATH T. CHEN whose telephone number is (571)270-1870. The examiner can normally be reached on M-F, 8:30-5:00 EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Michael Cleveland can be reached on 571-272-1418. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/K. T. C./
Examiner, Art Unit 1792

/Michael Cleveland/
Supervisory Patent Examiner, Art Unit 1792